1.

My Code –

```java
import java.util.Scanner;

public class FactorialWhileLoop
{
    public static void main(String[] args)
    {
        Scanner input = new Scanner(System.in);

        System.out.print("Enter the non-negative number to process its factorial: ");
        int number = input.nextInt();

        int fact = 1;
        int i = 1;

        while (i<=number)
        {
            fact = fact*i;
            i++;

        }
        System.out.print("The Factorial of " + number + "! = ");
        for (int j = number; j >= 1; j--)
        {
            if (j == 1)
            {
                System.out.print(j + " = ");
            }
            else
            {
                System.out.print(j +" x ");
            }
        }
        System.out.println(fact);
    }
}
```

Output –

```
manis@DESKTOP-279PI44 MINGW64 /f/RDP/1st Term/Introduction to Programming
$ cd "/f/RDP/1st Term/Introduction to Programming/Lab/Lab 3/" && javac FactorialWhileLoop.java && java FactorialWhileLoop
Enter the non-negative number to process its factorial: 5
The Factorial of 5! = 5 x 4 x 3 x 2 x 1 = 120
```

2.

My Code –

```java
import java.util.Scanner;

public class FactorialForLoop
{
    public static void main(String[] args)
    {
        Scanner input = new Scanner(System.in);

        System.out.print("Enter the non-negative number to process its factorial: ");
        int number = input.nextInt();

        int fact = 1;
        for (int i = 1; i <=number; i++)
        {
            fact = fact*i;
        }
        System.out.print("The Factorial of " + number + "! = ");
        for (int j = number; j >= 1; j--)
        {
            if (j == 1)
            {
                System.out.print(j + " = ");
            }
            else
            {
                System.out.print(j +" x ");
            }
        }
        System.out.println(fact);
    }
}
```

Output –

```
manis@DESKTOP-279PI44 MINGW64 /f/RDP/1st Term/Introduction to Programming
$ cd "/f/RDP/1st Term/Introduction to Programming/Lab/Lab 3/" && javac FactorialForLoop.java && java FactorialForLoop
Enter the non-negative number to process its factorial: 5
The Factorial of 5! = 5 x 4 x 3 x 2 x 1 = 120
```

3.

My Code –

```java
public class Alphabet
{
    public static void main(String[] args)
    {
        //UpperCase Alphabets
        System.out.print("Uppercase Alphabets: ");
        for (char ch = 'A'; ch <= 'Z'; ch++)
        {
            System.out.print(ch + " ");
        }
        System.out.println();
        //LowerCase Alphabets
        System.out.print("Lowercase Alphabets: ");
        for (char ch = 'a'; ch <= 'z'; ch++)
        {
            System.out.print(ch + " ");
        }
        System.out.println();
        //Uppercase Alphabets in Reverse
        System.out.print("Uppercase Alphabets in Reverse: ");
        for (char ch = 'Z'; ch >= 'A'; ch--)
        {
            System.out.print(ch + " ");
        }
        System.out.println();
        //Lowercase Alphabets in Reverse
        System.out.print("Lowercase Alphabets in Reverse: ");
        for (char ch = 'z'; ch >= 'a'; ch--)
        {
            System.out.print(ch + " ");
        }
    }
}
```

Output –

```
manis@DESKTOP-279PI44 MINGW64 /f/RDP/1st Term/Introduction to Programming/Lab/Lab 3
$ cd "/f/RDP/1st Term/Introduction to Programming/Lab/Lab 3/" && javac Alphabet.java && java Alphabet
Uppercase Alphabets: A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
Lowercase Alphabets: a b c d e f g h i j k l m n o p q r s t u v w x y z
Uppercase Alphabets in Reverse: Z Y X W V U T S R Q P O N M L K J I H G F E D C B A
Lowercase Alphabets in Reverse: z y x w v u t s r q p o n m l k j i h g f e d c b a
manis@DESKTOP-279PI44 MINGW64 /f/RDP/1st Term/Introduction to Programming/Lab/Lab 3
$
```

4.

My Code –

```java
import java.util.Scanner;

public class NumberSystem
{
    public static void main(String[] args)
    {
        Scanner input = new Scanner(System.in);

        System.out.print("Enter the non-negative number for binary conversion: ");
        int value = input.nextInt();

        int originalValue = value;

        String rslt = "";

        while (value>0)
        {
            int remainder = value%2;
            rslt = remainder + rslt;
            value = value/2;
        }

        System.out.println("The binary conversion of " + originalValue + " is = " + rslt);
    }
}
```

Output –

```
manis@DESKTOP-279PI44 MINGW64 /f/RDP/1st Term/Introduction to Programming/Lab/Lab 3
$ cd "/f/RDP/1st Term/Introduction to Programming/Lab/Lab 3/" && javac NumberSystem.java && java NumberSystem
Enter the non-negative number for binary conversion: 10
The binary conversion of 10 is = 1010
```

5. My Code –

```
import java.util.Scanner;

public class StringAnalyze
{
    public static void main(String[] args)
    {
        Scanner input = new Scanner(System.in);

        System.out.print("Enter a string: ");
        String ch = input.nextLine();

        int isUpperCase = 0;
        int isLowerCase = 0;
        int isDigit = 0;
        int isWhiteSpace = 0;

        for (int i = 0; i < ch.length(); i++)
        {
            char CrntCh = ch.charAt(i);

            if (Character.isUpperCase(CrntCh))
            {
                isUpperCase++;
            }
            else if (Character.isLowerCase(CrntCh))
            {
                isLowerCase++;
            }
            else if (Character.isDigit(CrntCh))
            {
                isDigit++;
            }
            else if (Character.isWhitespace(CrntCh))
            {
                isWhiteSpace++;
            }
        }

        System.out.println("Uppercase letters: " + isUpperCase);
        System.out.println("Lowercase letters: " + isLowerCase);
        System.out.println("Digits: " + isDigit);
        System.out.println("Whitespace characters: " + isWhiteSpace);
    }
}
```

Output –

```
manis@DESKTOP-279PI44 MINGW64 /f/RDP/1st Term/Introduction to Programming/Lab/Lab 3
$ cd "/f/RDP/1st Term/Introduction to Programming/Lab/Lab 3/" && javac StringAnalyze.java && java StringAnalyze
Enter a string: Hello World 123
Uppercase letters: 2
Lowercase letters: 8
Digits: 3
Whitespace characters: 2
```

6.

My Code –

```
import java.util.Scanner;

public class PasswordValidator
{
    public static void main(String[] args)
    {
        Scanner input = new Scanner(System.in);

        System.out.print("Enter Your Password: ");
        String password = input.nextLine();
        boolean condition = isValid(password);

        if (condition == true)
        {
            System.out.println("\"Congratulations! Your password meets the criteria.\"");
        }
        else
        {
            System.out.println("Sorry, your password must:\n- Be at least 8 characters
long\n- Contain at least one uppercase letter\n- Contain at least one lowercase letter\n-
Contain at least one digit\n- Not contain any whitespace characters\n");
        }

    }

    public static boolean isValid(String password)
    {
        boolean hasUpperCase = false;
        boolean hasLowerCase = false;
        boolean hasDigit = false;
        boolean hasWhiteSpace = true;
        if (password.length()<8)
        {
            return false;
        }
        else
        {
```

```
            for (int i = 0; i < password.length(); i++)
            {
                if (Character.isUpperCase(password.charAt(i)))
                {
                    hasUpperCase =  true;
                }
                else if (Character.isLowerCase(password.charAt(i)))
                {
                    hasLowerCase =  true;
                }
                else if (Character.isDigit(password.charAt(i)))
                {
                    hasDigit = true;
                }
                else if (Character.isWhitespace(password.charAt(i)))
                {
                    hasWhiteSpace = false;
                }
            }
            return hasUpperCase && hasLowerCase && hasDigit && hasWhiteSpace;
        }
    }
}
```

Output –

```
manis@DESKTOP-279PI44 MINGW64 /f/RDP/1st Term/Introduction to Programming/Lab/Lab 3
$ cd "/f/RDP/1st Term/Introduction to Programming/Lab/Lab 3/" && javac PasswordValidator.java && java PasswordValidator
Enter Your Password: Mahfuz12345
"Congratulations! Your password meets the criteria."

manis@DESKTOP-279PI44 MINGW64 /f/RDP/1st Term/Introduction to Programming/Lab/Lab 3
$ cd "/f/RDP/1st Term/Introduction to Programming/Lab/Lab 3/" && javac PasswordValidator.java && java PasswordValidator
Enter Your Password: mahfuz
Sorry, your password must:
- Be at least 8 characters long
- Contain at least one uppercase letter
- Contain at least one lowercase letter
- Contain at least one digit
- Not contain any whitespace characters
```

7.

My Code –

```
import javax.swing.JOptionPane;

public class GUICalculator
{
    public static void main(String[] args)
    {
        String input1 = JOptionPane.showInputDialog("Enter the first number");
        int number1 = Integer.parseInt(input1);

        String input2 = JOptionPane.showInputDialog("Enter the second number");
        int number2 = Integer.parseInt(input2);

        int addition = add(number1,number2);
        int substraction = sub(number1,number2);

        JOptionPane.showMessageDialog(null, "Addition Result: " + addition + "\n" +
"Substraction Result: " + substraction);
    }

    public static int add(int number1, int number2)
    {
        return number1 + number2;
    }

    public static int sub(int number1, int number2)
    {
        return number1 - number2;
    }
}
```

Output –

1st Input - 2nd Input - Result -